SYLLABUS OF A MODULE

Polish name of a module	**SYSTEMY BAZ DANYCH**
English name of a module	**Database Systems**
ISCED classification - Code	0612
ISCED classification - Field of study	*Database and network design and administration*
Languages of instruction	*English*
Level of qualification: ***1 – BSc (EQF 6)*** ***2 – MSc (EQF 7)*** ***3 – PhD (EQF 8)***	*2*
Number of ECTS credit points	*5*
Examination: ***EO – exam oral*** ***EW – exam written*** ***A - assignment***	*EW*
Available in semester: ***S – Spring only*** ***A – autumn only*** ***Y - booth***	*S*

Number of hours per semester:

Lecture	Exercises	Laboratory	Seminar	E-learning	Project
30	0	30	0	0	0

MODULE DESCRIPTION

MODULE OBJECTIVES

O1. Familiar with information about the various database systems currently available on the market

O2. Ability to design a database using various data models in various environments, taking into account security needs.

O3. Understanding the currently used data access languages.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of mathematics and basic programming.
2. Knowledge of object-oriented programming paradigms.
3. Knowledge of database fundamentals and database design.
4. Knowledge of SQL.
5. Ability to use various sources of information, including manuals and technical documentation.

LEARNING OUTCOMES

LO 1 – The student has knowledge of various database models and architectures (relational, object-oriented, object-relational, distributed, and semi-structured) and their applications.

LO 2 – The student has the ability to model and design various types of databases

LO 3 – The student has the following competencies: Is aware of the importance of non-technical aspects and consequences of engineering activities, including their impact on the environment, and the associated responsibility for decisions made.

MODULE CONTENT

Type of classes – lecture	**Number of hours**
Lec 1 - Revision and extension of SQL DML knowledge	**2**
Lec 2 - Revision and extension of SQL DDL knowledge	**2**
Lec 3 – The basics of PL/SQL language	**2**
Lec 4 – Cursors in PL/SQL	**2**
Lec 5 – Functions and procedures in PL/SQL	**2**
Lec 6 – Triggers in PL/SQL and dynamic SQL	**2**
Lec 7 – Introduction to contemporary database systems	**2**
Lec 8 - Summary of features of object-oriented and relational databases	**2**
Lec 9 - SQL3 – implementation of the object-relational model	**2**
Lec 10 - Types and Inheritance in SQL3	**2**
Lec 11 - Collections in SQL3	**2**
Lec 12 – Spatial databases	**2**
Lec 13 - Database systems using a semi-structured model	**2**
Lec 14 - XML document databases vs. native XML databases	**2**
Lec 15 – Threats to modern database systems	**2**
Sum	**30**
Type of classes– laboratory.	**Number of hours**
Lab 1 - Revision of SQL - DML	**2**
Lab 2 - Revision of SQL - DDL	**2**
Lab 3- PL/SQL language anonymous blocks and control Instructions	**2**
Lab 4 - PL/SQL language - cursors and exceptions	**2**
Lab 5 - Functions and procedures in PL/SQL	**2**
Lab 6 - Triggers in PL/SQL	**2**
Lab 7 - Test	**2**
Lab 8 - SQL3 – definitions of types	**2**
Lab 9 - SQL3 – Object tables and tables with objects	**2**
Lab 10-11 - Collections in SQL3	**4**
Lab 12 - Spatial databases	**2**
Lab 14 - SQL/XML	**2**
Lab 15 – Test	**2**
Sum	**30**

TEACHING TOOLS

1. - Multimedia presentations for lectures; the course may also be conducted via the PCz e-learning platform.
2. - Instructions for laboratories, the course may also be conducted via the PCz e-learning platform.
3. - Computer laboratory equipped with individual workstations

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE)

F1. - assessment of preparation for laboratory exercises
F2. - assessment of mid-term tests

F3. - assessment of activity during classes
S1. - assessment of the ability to solve posed problems and the way of presenting obtained results – Test / Oral examination*
S2. - assessment of mastery of the teaching material being the subject of the lecture - exam

*) in order to receive a credit for the module, the student is obliged to attain a passing grade in all laboratory classes as well as in achievement tests.

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	30
1.2	Tutorials	0
1.3	Laboratory	30
1.4	Seminar	0
1.5	Project	0
1.6	Examination	2
	Total number of contact hours with teacher:	62
2. Student's individual work		
2.1	Preparation for tutorials and tests	4
2.2	Preparation for laboratory exercises, writing reports on laboratories	30
2.3	Preparation of project	0
2.4	Preparation for final lecture assessment	0
2.5	Preparation for examination	8
2.6	Individual study of literature	21
	Total number of hours of student's individual work:	63
	Overall student's workload:	125
Overall number of ECTS credits for the module		5 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:		2,48 ECTS
Number of **ECTS** credits acquired during practical classes including laboratory exercises and projects:		2,6 ECTS

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. C. J. Date - An Introduction to Database Systems, Fifth Edition. AddisonWesley, 2003, ISBN 0-201-51381-1
2. J. Ullman - First course in database systems, Prentice-Hall Inc., Simonand Schuster, Page 1, 1997, ISBN 0-13-861337-0
3. H. Garcia-Molina and J. Widom - Database Systems: The Complete Book, Prentice-Hall, Englewood Cliffs, NJ, 2002
4. P. Beynon-Davies - Database Systems. 3rd Edition. Palgrave, 2004, Houndmills,Basingstoke
5. M. McLaughlin - Oracle Database 11g, PL/SQL Programming, McGraw-Hill Companies, 2008
6. J. Price, Oracle Database 11g SQL, McGraw-Hill, 2008

7.	D. Tow, SQL Tunning, O'Reilly 2003
8.	S. Feuerstein, B. Pribyl - Oracle PL/SQL Programming (4th ed.).O'Reilly and Associates, 2005, ISBN 0-596-00977-1
9.	M. Stonebraker, D. Moore - Object-Relational DBMSs: The NextGreat Wave. Morgan Kaufmann Publishers, 1996, ISBN 1-55860-397-2.
10.	G. Lausen, G. Vossen - Models and languages of object-oriented data-bases, Addison-Wesley 1998
11.	T. W. Ling, M. L. Lee, G. Dobbie - Semistructured Database Design Springer- VerlagGmbH 2005
12.	http://www.oracle.com/technology/documentation/index.html
13.	M. Lazarska, O. Siedlecka-Lamch - Comparative study of relational and graph databases, in Proc. IEEE 15th International Scientific Conference on Informatics, IEEE, 234-241, 2019
14.	S. Sławczyk, O. Siedlecka-Lamch - How to improve blockchain for blogosphere?, in Proc.: IEEE 16th International Scientific Conference on Informatics, Poprad, Slovakia, November 23-25, IEEE, 273-279, 2022

MODULE COORDINATOR (NAME, SURNAME, E-MAIL ADDRESS)

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